

Is Earnings Management Opportunistic or Beneficial in Taiwan? Application of Panel Smooth Transition Regression Model

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Abstract

This paper analyzes whether discretionary accruals affects firm value under the corporate governance mechanism via a panel of 277 Taiwanese listed companies from 1997 to 2007. Our results show that when managerial ownership is less than 9.67%, managers may engage in opportunistic earnings management. However, while managerial ownership higher than 9.67%, managers may tilt toward efficient earnings management. Only efficient earnings management is found in either board size less than 9 members or more than 12 members and institutional ownership less than 43.8%. Also, small board has greater impact on efficient earnings management than larger board. When the proportion of outside directors is below 38.73%, they can effectively supervise managers to engage in efficient earnings management.

Keywords: Firm value, Corporate Governance, Earnings Management

1. Introduction

Recently fraud cases have come out one after another in Taiwan, basically due to an unsound company operating system and the lack of corporate governance mechanism to control the behavior of managers, in which managers use earnings management to empty out the firms' assets, resulting in damages to investors' interests. However, would managers that engage in earnings management reduce firm value? Would sound corporate governance exert efficient supervising mechanism to make managers engaging in efficient earnings management?

Earnings management is divided into opportunistic earnings management and efficient earnings management. The purposes of opportunistic earnings management is that managers use judgment in financial reporting and in non-routine transactions to modify financial reports and attempt to mislead some shareholders about the viewpoint of the company or to affect the results of the accounting-based contract that depend on reported accounting numbers (Healy and Wahlen, 1999). The purposes of efficient earnings management is that managers want to convey private information to investors, to improve the informational content to earnings and promote communication between managers, shareholders and the public (Jiraporn et al., 2008; Siregar et al., 2008).

Several studies find evidence consistent with the opportunistic perspective. These studies suggest that managers will have the motivation to manipulate earnings when their compensation is more closely tied to the value of stock and option holdings (Bergstresser and Philippon, 2006) or in order to avoid the violation of the debt contract (Hakim and Zeghal, 2006), or avoid reporting losses and earnings declines (Park and Shin, 2004). However, other studies find evidence that is consistent with the efficient perspective. These literatures have pointed out that discretionary accruals add the informational content to earnings (Subramanyam, 1996), help managers generate a reliable and more timely measure of firm performance (Guay et al., 1996). Anil et al. (2003) suggest that a managed earnings stream can convey more information than an unmanaged earnings stream in a decentralized organization, because information is dispersed across persons.

The purpose of this paper is in the same line as previous literature in investigating the earnings management and firm value using Taiwan data. Although their relationship has been the subject of considerable debate throughout the literature, particularly the West, little is known about Taiwan, an emerging market economy where legal, financial and economic institutions are different from the West. Unlike the past literature which use square of managerial ownership, board size, institutional ownership and proportion of outside directors to investigate the optimal level, we empirically divide the sample into two or three regimes based on the data. The present study applies a panel smooth transition regression model to observe the balanced panel data in order to test whether there is an optimal level of the managerial ownership, board size, proportion of outside directors and institutional ownership at which point the threshold effect and asymmetrical relationship between earnings management and firm value may be determined.

2. Literature Review and Hypotheses Development

As managerial ownership increases, there is greater alignment of interests of managers and outside shareholders (Jensen and Meckling, 1976; Carl et al., 2003). At this time, managers based on the interest maximization of companies will engage in efficient earnings management. However, when managerial ownership is between 5% and 25% (Morck et al., 1988) or between 14% and 40% (Bhabra, 2007), managers who control a substantial fraction of the firm's equity may have enough voting rights, pushing managers' self-wealth and shares price to be closely linked, in order to ensure their employment, at this time, consist with entrenchment hypothesis, managers will

engage in opportunistic earnings management. So we bring up hypothesis 1: If different regimes of managerial ownership exist, the relation between discretionary accruals and firm value will be non-linear.

The function of board of directors is to provide its strategy and oversight for managers. Larger boards of directors possessing financial and governance expertise to guide managers making maximizing-benefits decision of company in due course, so they can exert effect of supervise to increase firm value (Lee and Chuang, 2007; Louis, 2008 ; Hung et al, 2005). Therefore, large boards can effectively exert the functions of supervision to make managers to engage in efficient earnings management. But, small board is less differences of opinion within the organization and the advantages of better coordination, flexibility and communication (Andres et al., 2005). Smaller boards can provide better oversight functions (Rashidah and Ali, 2006 ; Jaggi and Leung, 2007). Earnings are more informative in smaller boards (Vafeas, 2000). Therefore, we bring up hypothesis 2: If different regimes of board size happen, the relation between discretionary accruals and firm value will be non-linear.

When companies have more outside directors, they can more effectively monitor and control managers (Chung et al., 2001; Xie et al., 2003; John et al., 2007) and reduce managers to adjust earnings for avoiding reporting losses and earnings reductions (Peasnell et al., 2005). Because of outside directors with independent, professional knowledge and experience, they can provide more impartial and objective recommendations to the company based on the benefits of company to enhance firm value (Fang et al., 2008). Thus, when the proportion of outside directors is high, managers will engage in efficient earnings management. Nevertheless, when outside directors based on the self-serving incentives or lack of financial knowledge, they are unable to effectively supervise managers, give valuable advice or detect the earnings management and inhibit opportunities earnings management (Park and Shin, 2004 ; Cheng, 2008). Therefore, we bring up hypothesis 3: If the proportion of outside directors is different, the relation between discretionary accruals and firm value will be non-linear.

In addition to internal oversight mechanisms, institutional investors belong to the external governance mechanism (Gillan, 2006; Kooyul and Soo, 2002; Carl et al., 2003). Managers' entrenchment would be increasingly difficult as more institutional investors monitor them; therefore, earnings informativeness increases with the holdings of institutions (Han and Suk, 1998), Large institutional shareholdings inhibit managers from increasing or decreasing reported profits towards the managers' desired level of profits (Chung et al., 2001). Thus, as the institutional ownership increases, managers are more likely to engage in efficient earnings management. However, when there is the conflict interests of institutional investors and company, institutional investors obtain information to engage in increasing their personal wealth by the identity of its shareholders (Lee and Chuang, 2007), or only focus on short-term profit (Hung et al, 2005), reducing institutional investors' monitoring quality. At this time, as the institutional ownership increases, institutional investors can not inhibit managers from engaging opportunities earnings management. So we bring up hypothesis 4: If different regimes of institutional ownership occur, relation between discretionary accruals and firm value will be non-linear.

3. Sample Selection and Research Methodology

3.1. Sample

We conduct our investigation using balanced panel data for a sample of 1,607 firms listed in Taiwan Stock Exchange covering the period from 1997 to 2007. All our data come from the *Taiwan Economic Journal* (TEJ) database of Taiwan. We exclude 131 financial, securities and insurance firms, because the nature of capital and investment in these industries are not comparable to those of non-financial firms. 573 firms with missing financial information and 626 firms with missing corporate governance information are excluded. After the exclusion, the final sample is 277 public trading companies, distributed across the eighteen industry sectors as follows: Electron (57), Textiles (37), Plastics (15), Steel and Iron (19), Construction (19), Chemical (16), Food (14), Transportation (12). The residual 88 companies are from the remaining sectors. The electronics and textiles industries together account for about one-third of the sample, while the remaining industries each makes up less than nine percent.

3.2. Variables

As the proxy for firm value, we adopt Tobin's Q developed by La Porta et al. (2002), which is calculated as the book value of assets minus the book value of equity minus deferred taxes plus the market value of common stock divided by the book value of total assets. Follow Jiraporn et al.(2008), we use absolute value of discretionary accruals as a proxy the degree of earning management. We use the modified Jones model (1991) to estimate discretionary accruals. The threshold variables include the managerial ownership (the percentage of equity owned by the board of directors and supervisors to total equity), the board size (the natural log of the number of directors and supervisors), the institutional ownership (the percentage of equity owned by the institution and corporation to total equity) and the proportion of outside directors (the proportion of outside directors on the firm board). We also include three control variables commonly used in the analysis of firm value, namely, the natural log of the book value of total assets (SIZE); the ratio of total liabilities to total assets (LEV); the rate of sales growth (Sales growth), which is calculated as the annual percentage change in sale.

3.3. Research Methodology

According to Gonza'lez, Teräsvirta and Dijk (2004, 2005), we set up the panel smooth transition regression

model as follows:

$$y_{it} = \mu_i + \beta_0' x_{it} + \beta_1' x_{it} g(q_{it}; \gamma, c) + \varepsilon_{it} \quad (1)$$

$$y_{it} = (\text{Tobin's } Q_{it}) \quad q_{it} = (MAN_{it}, LnBOA_{it}, INST_{it}, OUT_{it})$$

$$x_{it} = (q_{it}, ABSDAC_{it}, SIZE_{it}, LEV_{it}, GROWTH_{it})$$

Where y_{it} is Tobin's Q which is a proxy as firm value. $g(q_{it}, \gamma, c)$ is a transition function, q_{it} is transition variable which include the managerial ownership (MAN_{it}), the board size ($LnBOA_{it}$), the institutional ownership ($INST_{it}$) and the proportion of outside directors (OUT_{it}); γ determines the slope of the transition function; c is threshold parameter. x_{it} represents variable of influence on firm value, $ABSDAC_{it}$ is absolute value of discretionary accruals; control variables are firm size ($SIZE_{it}$), leverage ratio (LEV_{it}) and sales growth ($GROWTH_{it}$).

In the panel smooth transition regression model, the transition function $g(q_{it}, \gamma, c)$ is a continuous and bounded function of the threshold variable q_{it} and is normalized to be bounded between 0 and 1, and these extreme values are associated with regression coefficients β_0 and $\beta_0 + \beta_1$. The value of q_{it} determines the value of $g(q_{it}, \gamma, c)$ and thus the effective regression coefficients $\beta_0 + \beta_1$, $g(q_{it}, \gamma, c)$ for individual i at time t . Follow Granger and Teräsvirta (1993), Teräsvirta (1994) and Jansen and Teräsvirta (1996) by using the logistic transition function:

$$g(q_{it}; \gamma, c) = (1 + \exp(-\gamma \prod_{j=1}^m (q_{it} - c_j)))^{-1}, \gamma > 0, c_1 \leq c_2 \leq \dots \leq c_m \quad (2)$$

Where $c = (c_1, \dots, c_m)'$ is an m -dimensional vector of location parameters and the parameter γ determines the smoothness of the transitions. In practice it is usually sufficient to consider $m = 1$ or $m = 2$, as these values allow for commonly encountered types of variation in the parameters. When the $m = 1$ and $\gamma \rightarrow \infty$, the PSTR model is like of panel threshold model of Hansen (1999). When the $m = 2$ and $\gamma \rightarrow \infty$, the model becomes a three-regime threshold model whose outer regimes are identical and different from the middle regime. When $m > 1$ and $\gamma \rightarrow \infty$, the number of distinct regimes remains two, with the transition function switching back and forth between zero and one at c_1, \dots, c_m . Finally, for any value of m the transition function (2) becomes constant when $\gamma \rightarrow 0$, in which case the model collapses into a homogenous or linear panel regression model with fixed effects. In the PSTR model (1) is a relatively straightforward application of the fixed effects estimator and nonlinear least squares (NLS).

4. Empirical Results

4.1. Descriptive Statistics

Table 1 presents the descriptive statistics for our pooled sample of 277 Taiwan listed companies during the 1997-2007. Tobin's Q is more evenly distributed with a pooled mean value of 1.41. The pooled mean absolute value of discretionary accruals is 0.07, which is not differences between Taiwan and other countries, Canada is 0.103 (Park and Shin, 2004), U.S is 0.069 (Jiraporn et al., 2008). The pooled mean managerial ownership is 21.27%. The pooled mean number of board of directors is 10 people. Institutional ownership has an average value of 36.65%. The proportion of outside directors has a mean value of 16.08%. As for the control variables, on average for the sample, the size distribution of our sample firm is also skewed by the large differences between mean (11,906.95 millions NTD) and median (4,143.21 millions NTD) total assets for the pooled sample, the rate of Sales growth is 10.61%, the ratio for Leverage is 40.41%. On the basis of the Jarque-Bera test results, we reject the normality of all the variables.

4.2. Empirical Results

4.2.1. Managerial Ownership

Table 2 presents that managerial ownership has a threshold effect on firm value, which is 9.67%, and it separate all of the observations into two regimes, the high managerial ownership ($MAN_{it} > 9.67\%$) and the low managerial ownership ($MAN_{it} < 9.67\%$) and are all significant at the 1% level. The coefficients of discretionary accruals, β_0 and β_1 in two regimes are -0.7521 and 1.5041, respectively and are all significant at the 5% level. In the low and

high managerial ownership regimes, firm value decrease by 0.7521% and increase by 0.7520% ($\beta_0 + \beta_1$) with a 1% increase in the discretionary accruals, respectively. Thus, consistent with entrenchment effect in low managerial ownership regimes, managers may engage in opportunistic earnings management and decrease firm value. In contrast, alignment effect is found in the high managerial ownership regime, suggesting that as managerial ownership increase, managers engage in efficient earnings management and increases firm value. The supportive of alignment effect can be accounted for the fact Taiwan corporate boards are dominated by controlling families who hold a large portion of equity, and generally have incentive to align outside shareholders' interest with maintaining the objective of contributing to firm value.

In the estimations of the coefficients of the control variables, the coefficients of firm size, β_0 and β_1 in two regimes are -0.1568 and 0.3137, respectively and are all significant at the 1% level. The result suggests that the lower the managerial ownership, the lower the degree of transparency of managerial actions (Bhabra, 2007) and inefficient operation is in large firm (Fama and French, 1992), also reducing firm value. However, as managerial ownership increases, managers have incentive to align outside shareholders' interest, and large firms have better disclosure, a high degree of trading liquidity, more attention from analysts and more supervision by the general (Claessens et al., 2002), then increasing firm value. However, the sales growth and leverage are not significantly related to Tobin's Q in low or high managerial ownership regime. The panel smooth transition regression model of managerial ownership is as follows:

$$Q_{it} = \mu_i - 0.7521ABSDA_{it} + 0.4551MAN_{it} - 0.1568Size_{it} + 0.0154Growth_{it} + 0.2537LEV_{it} \\ + g(MAN_{it}, 1.5750e - 005, 9.67\%)(1.5041ABSDA_{it} - 0.9103MAN_{it} + 0.3137Size_{it} \\ - 0.0309Growth_{it} - 0.5074LEV_{it}) + \varepsilon_{it}$$

Table 3 presents the percentage of firms which fall into the two regimes of managerial ownership in each year. We find that approximately 17% of firms fall within the low managerial ownership regime. However, approximately 83% of firms fall within the high managerial ownership regime, because the securities and exchange law in Taiwan sets a minimum shareholding associated with all members of the board of directors and the supervisors (Note 1), so we further study the 83% firms in high managerial ownership regime according to the law. Table 4 presents that there are 168 (72.72%), 46 (19.91%) and 17 (7.36%) firms' managerial ownership are excess of 5.5%, 8.25% and 11% statutory managerial ownership, when their capitalization (millions NTD) is more than 2,000, more than 1,000 but 2,000 or less and more than 300 but 1,000 or less, respectively. Therefore, the majority of firms' managerial ownership in high regime is excess of statutory managerial ownership. To achieve the statutory law, managers have incentive to engage in efficient earnings management to align outside shareholders' interest with maintaining the objective of contributing to firm value.

4.2.2. Board Size

Table 5 shows that board size has two threshold effects on firm value, which are 9 and 12 people. The coefficients of discretionary accruals, β_0 , β_1 and β_2 in three regimes are 2.7981, 3.438 and -1.4549, respectively, but only β_0 and β_2 are significant at the 1% and 5% level, respectively. When the board size is either less than 9 people or more than 12 persons, the coefficients of discretionary accruals is significant positive, β_0 and ($\beta_0 + \beta_1 + \beta_2$) are 2.7981 and 1.9908, respectively. Thus, only efficient earnings management is found in either small or larger board. Also, small board has greater impact on efficient earnings management than larger board. This suggest that small board is less differences of opinion within the organization and the advantages of better coordination, flexibility and communication (Andres et al., 2005) and can provide better oversight functions (Rashidah and Ali, 2006; Jaggi and Leung, 2007) to make managers engaging in efficient earnings management.

In the estimations of the coefficients of the control variables, the coefficients of firm size, β_0 , β_1 and β_2 in three regimes are -0.1951, -0.5094 and 0.1988, respectively, but only β_0 and β_2 are significant at the 1% and 5% level, respectively. When the board size is more than 12 people, the coefficients ($\beta_0 + \beta_1 + \beta_2$) of firm size is -0.5057. Thus, larger board has greater impact on larger firm than small firm. It has different opinion within the organization and worse coordination, flexibility and communication in large board and inefficient operation in large firm (Fama and French, 1992). When the board size is between 9 and 12 people, and more than 12 people, the coefficient of sales growth rate ($\beta_0 + \beta_1$), ($\beta_0 + \beta_1 + \beta_2$) are 1.2291 and 0.0614, respectively, both significantly and positively. This suggest that larger board size can effectively monitor the managers to increase the sales growth and firm value (Luo and Hachiya, 2005; Mak and Kusnadi, 2005). Finally, the coefficient (β_0) of leverage is significant negative, suggesting that small board cannot effectively supervise the managers to make high-risk decision to finance (Liao et

al., 2006); increasing the company's financial crisis and bankruptcy risk, thereby reducing the firm value (Maury and Pajuste, 2005; Carl et al., 2003). The panel smooth transition regression model of board size is as follows:

$$Q_{it} = \mu_i + 2.7981 ABSDA_{it} - 0.2995 LnBOA_{it} - 0.1951 Size_{it} + 0.1274 Growth_{it} - 12.604 LEV_{it} \\ + g(LnBOA_{it}, 34.2904, 9)(1.4504 ABSDA_{it} + 3.4380 LnBOA_{it} - 0.5094 Size_{it} + 1.1017 Growth_{it} - \\ 0.6003 LEV_{it}) + g(LnBOA_{it}, 266.56, 12)(-2.2577 ABSDA_{it} - 1.4549 LnBOA_{it} + 0.1988 Size_{it} \\ - 1.1677 Growth_{it} + 0.3148 LEV_{it}) + \varepsilon_{it}$$

Table 6 presents the percentage of firms which fall into the three regimes of the board size each year. We find that approximately 58%, 23 % and 19% of firms fall within the first, second and third regime, respectively. Therefore, the majority of firms are small board and it has stronger impact on efficient earnings management than greater board. The supportive of smaller board can be accounted for by the fact that according to the securities and exchange law in 2007, firms listed in Taiwan Stock Exchange shall set at least 5 directors (Note2).

4.2.3. Outside Directors

Table 7 shows that proportion of outside directors has a threshold effect on firm value, which is 38.73%, and it separate all of the observations into two regimes, the low proportion of outside directors ($OUT < 38.37\%$) and the high proportion of outside directors ($OUT > 38.37\%$), but only the low regime is significant at the 1% level. The coefficients of discretionary accruals, β_0 in low regime is 2.6318 and significant at the 1% level. In the low regimes, firm value increase by 2.6318% with a 1% increase in the discretionary accruals. The independence of outside directors with professional knowledge and experience, provide more impartial and objective recommendations to the company, and help managers to make decision (Fang et al., 2008), and effectively monitor and control managers (Chung et al., 2002; Xie et al., 2003) to engage efficient earnings management.

In the estimations of the coefficients of the control variables, the coefficient of sales growth rate and leverage, both β_0 in low regimes are 0.2980 and -1.0769, respectively, all significant at the 1% level, suggesting that low proportion of outside directors can effectively monitor managers to increase the sales growth rate (Luo and Hachiya, 2005; Mak and Kusnadi, 2005), decrease debt ratio and enhance firm value (Lee and Chuang, 2007). The panel smooth transition regression model of proportion of outside directors is as follows:

$$Q_{it} = \mu_i + 2.6318 ABSDA_{it} + 0.0087 OUT_{it} - 0.3424 Size_{it} + 0.2980 Growth_{it} - 1.0769 LEV_{it} \\ + g(OUT_{it}, 157.2170, 14.91\%)(0.9638 ABSDA_{it} + 0.0077 OUT_{it} - 0.0070 Size_{it} \\ + 0.1515 Growth_{it} - 0.8032 LEV_{it}) + \varepsilon_{it}$$

Table 8 presents the percentage of firms which fall into the two regimes of the proportion of outside directors each year. We find that approximately 74% of firms fall within the low regime and 26% of firms fall within high regime. The supportive of low proportion of outside directors can be accounted for by the fact that according to the securities and exchange law in 2007, firms listed in Taiwan Stock Exchange shall set at least two independent directors in the board of directors and at least one-fifth of board seats (Note 3).

4.2.3. Institutional ownership

Table 9 presents that institutional ownership has two threshold effects on firm value, which are 43.8% and 48.8%. The coefficients of discretionary accruals, β_0 , β_1 and β_2 in three regimes are 3.2667, 0.2829 and -1.5726, respectively, but only β_0 is significant at the 1%. In the low regimes, firm value increase by 3.2667% with a 1% increase in the discretionary accruals. Thus, only efficient earnings management is found in low institutional ownership. Because institutional investors own more resources, they have incentive and ability to monitor managers (Chang et al., 2007) and to inhibit their selfish acts (Chung et al., 2001) to make managers engaging in efficient earnings management.

In the estimations of the coefficients of the control variables, the coefficients of firm size, β_0 , β_1 and β_2 in three regimes are -0.1981, -0.6184 and 0.1698, respectively, only β_1 is insignificant, β_0 and β_2 are significant at the 1%, respectively. When the institutional ownership is more than 48.8%, the coefficient ($\beta_0 + \beta_1 + \beta_2$) of firm size is -0.6467. Thus, higher institutional ownership has more negatively impact on larger firm than smaller firm. The institutional investors can obtain information by the identity of their shareholders and engage in self-beneficial activities (Lee and Chuang, 2007) and only focus on short-term profit, inefficiently supervise the managers (Hung et al, 2005) to operate efficiently in large firms (Fama and French, 1992), thereby reducing the firm value. The coefficients of sales growth rate, β_0 , β_1 and β_2 in three regimes are -0.301, 1.9454 and -1.0064, respectively, only

β_1 is insignificant, β_0 and β_2 are significantly negative at the 5% and 1%, respectively. The coefficient ($\beta_0 + \beta_1 + \beta_2$) of sales growth rate is 0.637 in high institutional ownership. Thus, the higher the institutional ownership, the higher the sales growth rate, thereby reducing the firm value (Luo and Hachiya, 2005; Mak and Kusnadi, 2005). The coefficients of leverage, β_0 , β_1 and β_2 in three regimes are -2.9818, 4.7465, and -0.9281, respectively and only β_2 is insignificant, β_1 and β_2 are significantly negative at the 1% and 5%, respectively. In low institutional ownership, the coefficient of leverage β_0 is -2.9818, but the coefficient ($\beta_0 + \beta_1 + \beta_2$) of leverage in high regime is 0.8366, suggesting that low institutional ownership cannot effectively supervise the manager to make high-risk decision to finance (Liao, 2006); increasing the company's financial crisis and bankruptcy risk, thereby reducing the firm value (Maury and Pajuste, 2005; Carl et al., 2003). The high institutional ownership, by contrast, effectively supervises the managers and obtains the confidence of creditors to finance, thereby increasing the firm value (Hung et al, 2005). The panel smooth transition regression model of institutional ownership is as follows:

$$Q_{it} = \mu_i + 3.2667ABSDA_{it} + 3.2433INST_{it} - 0.1981Size_{it} - 0.3015Growth_{it} - 2.9818LEV_{it} \\ + g(INST_{it}, 5.2840, 43.8\%)(0.2829ABSDA_{it} + 7.4215INST_{it} - 0.6184Size_{it} + 1.9454Growth_{it} \\ + 4.7465LEV_{it}) + g(INST_{it}, 99.6327, 48.8\%)(-1.5726ABSDA_{it} - 4.4214INST_{it} + 0.1698Size_{it} \\ - 1.0064Growth_{it} - 0.9281LEV_{it}) + \varepsilon_{it}$$

Table 10 presents the percentage of firms which fall into the three regimes of institutional ownership in each year. We find that approximate 63%, 8% and 29% of firms fall within low, middle and high regime, respectively. Therefore, the majority of firms are low institutional ownership in Taiwan and only efficient earnings management is found in low institutional ownership. The supportive of low institutional ownership can be accounted for the fact that the majority of investors are individual investor not the institutional investors(Note 4).

5. Conclusion

This paper analyzes whether discretionary accruals affects firm value under the corporate governance mechanism via a panel of 277 Taiwanese listed companies from 1997 to 2007. We employ a panel smooth transition regression model to test whether there is an "optimal" level of managerial ownership, board size, institutional ownership and proportion of outside directors, which may cause there to be threshold effects between managerial ownership, board size, institutional ownership and proportion of outside directors and firm value. Our results show that when managerial ownership is less than 9.67%, managers may engage in opportunistic earnings management. However, while managerial ownership higher than 9.67%, managers may tilt toward efficient earnings management. Only efficient earnings management is found in either small or larger board. Also, small board has greater impact on efficient earnings management than larger board. When the proportion of outside directors is below 38.73%, the outside directors can effectively supervise managers to engage in efficient earnings management. Also, only efficient earnings management is found when institutional ownership is less than 43.8%. We recommend that future research be conducted to continue this line of work. We use Tobin's Q as a proxy for firm value in this study, but future research can add the return on assets, return on equity of accounting performance indicators, the study can be complete. Second, it can be aimed at the industry classification to in-depth study and it will provide the industry with application of business strategy, because the situations are differences in various industries.

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Notes

Note1. The securities and exchange law in Taiwan sets a minimum shareholding of board of directors and supervisors. Where the firm capitalization is NT\$300 million or less(more than NT\$300 million but NT\$1000 million or less), the minimum required shareholding of board of directors should not be less than 15% (10%)of the total issued shares; the minimum required shareholding of supervisors should not be less than 1.5%(1.0%) of the total issued shares. Where the firm capitalization is more than NT\$1000 million but NT\$2000 million or less (more than NT\$2000 million), the minimum required shareholding of board of directors should not be less than 7.5% (5%)of the total issued shares; the minimum required shareholding of supervisors should not be less than 0.75% (0.5%) of the total issued shares.

Note2. Article 26-3 of the securities and exchange law in Taiwan.

Note 3. Article 14-2 of the securities and exchange law in Taiwan.

Note4. According to type of investors and trading value ratio of statistical data in the centralized market, domestic institutional investor holds 13.0 %, Foreign Institutional Investors owns about 17.6%, domestic individual stockowners holds 67.3%, and Foreign Individual Investors holds 2.1% in year 2007, so individual investors are the major participants of Taiwan stock market.(Major Indicators of Securities & Futures Markets, Taiwan District, ROC, Securities & Futures Bureau, Financial Supervisory Commission, Executive Yuan, December, 2007.)

Appendices

Table 1. Descriptive statistics of variables

Variables	Mean	Std. Dev.	Quartile 3	Median	Quartile 1	Jarque-Bera
Tobin's Q	1.41	1.16	1.58	1.08	0.82	234310.8***
ABSDA	0.07	0.07	0.09	0.05	0.02	99096.42***
MAN	21.27	12.69	27.53	18.14	11.77	897.1674***
BOA	10.00	3.00	12.00	9.00	7.00	2782.441***
INST	36.65	20.78	51.88	35.64	19.45	108.4061***
OUT	16.08	15.66	27.78	14.29	0	276.19***
SIZE	15.33	1.36	16.17	15.24	14.52	198.1389***
GROWTH	10.61	61.47	17.81	4.50	-6.49	7036031***
LEV	40.41	16.62	50.21	39.79	28.47	113.4259***
Assets(\$millions)	11906.95	25759.60	10571.43	4143.21	2015.69	318157.5***

Tobin's Q is firm value. ABSDA is absolute value of discretionary accruals. MAN is managerial ownership ; BOA is board size ; INST is institutional ownership ; OUT is proportion of outside directors, SIZE is firm size ; GROWTH is sales growth ; LEV is leverage ; Assets are total assets. ***, **, and * indicate significance at the 0.01, 0.05 and 0.1 levels, respectively.

Table 2. Estimation for threshold effects of managerial ownership

Threshold value C	C 1= 9.67%		Slopes parameters $\gamma 1=1.5750e-005$	
	MAN	9.67%	MAN > 9.67%	
	β_0		β_1	
MAN_{it}	0.4551***		-0.9103***	
$ABSDAC_{it}$	-0.7521**		1.5041**	
$SIZE_{it}$	-0.1568***		0.3137	
$GROWTH_{it}$	0.0154		-0.0309	
LEV_{it}	0.2537		-0.5074	

***, **, and * indicate significance at the 0.01, 0.05 and 0.1 levels, respectively. MAN is managerial ownership. ABSDA is absolute value of discretionary accruals. SIZE is firm size. GROWTH is sale growth. LEV is leverage.

Table 3. Number (Percentage) of Firms in Each Regime by Year

Regime Class	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Average
MAN 9.67%	19 (7%)	29 (10)	33 (12%)	32 (12)	43 (16)	52 (19)	58 (21%)	56 (20%)	58 (21%)	61 (22%)	60 (22%)	46 (17%)
MAN > 9.67%	258 (93%)	248 (90)	244 (88%)	245 (88)	234 (84)	225 (81)	219 (79%)	221 (80%)	219 (79%)	216 (78%)	217 (78%)	231 (83%)

() denotes annual sample of percentage.

Table 4. Number of firms' managerial ownership is excess of statutory in high regime by year

Capitalization (millions NTD)	statutory	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Average
Above 2,000	5.5%	156	171	175	185	177	172	165	166	161	158	159	168
1,000 to 2,000	8.25%	69	57	56	51	47	40	39	38	36	36	36	46
300 to 1,000	11%	31	20	13	9	9	11	13	16	21	22	21	17
Under 300	16.5%	1	0	0	0	0	0	1	0	0	0	1	0
Total		257*	248	244	245	233*	223**	218*	220*	218*	216	217	231

* and ** indicate a firm and two firms' managerial ownership not excess of statutory, respectively. Capitalization (millions New Taiwanese Dollars)

Table 5. Estimation for threshold effects and coefficients of board size

Threshold value C	C 1=9		C 2=12			
	$\gamma 1=34.2904$		$\gamma 2=266.5600$			
Slopes parameters γ	BOA < 9		9 < BOA < 12		BOA > 12	
	β_0		β_1		β_2	
$LnBOA_{it}$	-0.2995	*	3.4380	***	-1.4549	**
$ABSDAC_{it}$	2.7981	***	1.4504		-2.2577	**
$SIZE_{it}$	-0.1951	***	-0.5094		0.1988	**
$GROWTH_{it}$	0.1274		1.1017	***	-1.1677	***
LEV_{it}	-1.2604	***	-0.6003		0.3148	

***, **, and * indicate significance at the 0.01, 0.05 and 0.1 levels, respectively. $LnBOA_{it}$ is board size. ABSDA is absolute value of discretionary accruals. SIZE is firm size. GROWTH is sale growth. LEV is leverage.

Table 6. Number (Percentage) of Firms in Each Regime by Year

Regime	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Average
BOA ≤ 9	145 (52%)	154 (56%)	160 (58%)	163 (59%)	159 (57%)	161 (58%)	166 (60%)	165 (60%)	168 (61%)	163 (59%)	165 (60%)	161 (58%)
$9 < \text{BOA} \leq 12$	63 (23%)	63 (23%)	60 (22%)	58 (21%)	63 (23%)	67 (24%)	64 (23%)	64 (23%)	65 (23%)	73 (26%)	71 (25%)	65 (23%)
BOA > 12	69 (25%)	60 (21%)	57 (20%)	56 (20%)	55 (20%)	49 (18%)	47 (17%)	48 (17%)	44 (16%)	41 (15%)	41 (15%)	51 (19%)

()denotes annual sample of percentage.

Table 7. Estimation for threshold effects and coefficients of proportion of outside directors

Threshold value C	C 1=38.37%	
Slopes parameters γ	$\gamma_1=157.2170$	
	OUT $\leq 38.37\%$	OUT $> 38.37\%$
	β_0	β_1
OUT_{it}	0.0087 ***	0.0077
$ABSDAC_{it}$	2.6318 ***	0.9638
$SIZE_{it}$	-0.3424	-0.0070
$GROWTH_{it}$	0.2980 ***	0.1515
LEV_{it}	-1.0769 ***	-0.8032

***, **, and * indicate significance at the 0.01, 0.05 and 0.1 levels, respectively. OUT is the proportion of outside directors. ABSDA is the absolute value of discretionary accruals. SIZE is firm size. GROWTH is sale growth. LEV is leverage.

Table 8. Number (Percentage) of Firms in Each Regime by Year

Regime	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Average
OUT $\leq 38.73\%$	167 (60%)	187 (68%)	195 (70%)	208 (75%)	221 (80%)	227 (82%)	230 (83%)	221 (80%)	209 (75%)	204 (74%)	194 (70%)	206 (74%)
OUT $> 38.73\%$	110 (40%)	90 (32%)	82 (30%)	69 (25%)	56 (20%)	50 (18%)	47 (17%)	56 (20%)	68 (25%)	73 (26%)	83 (30%)	71 (26%)

()denotes annual sample of percentage.

Table 9. Estimation for threshold effects and coefficients of institutional ownership

Threshold value C	C 1=43.8%		C 2=48.8%			
Slopes parameters γ	$\gamma_1=5.2840$		$\gamma_2=99.6327$			
	INST $\leq 43.8\%$		43.8% $<$ INST $\leq 48.8\%$		INST $> 48.8\%$	
	β_0		β_1		β_2	
$INST_{it}$	3.2433 ***		7.4215 *		-4.4214 ***	
$ABSDAC_{it}$	3.2667 ***		0.2829		-1.5726	
$SIZE_{it}$	-0.1981 ***		-0.6184		0.1698 ***	
$GROWTH_{it}$	-0.3015 **		1.9454		-1.0064 ***	
LEV_{it}	-2.9818 ***		4.7465		-0.9281 **	

***, **, and * indicate significance at the 0.01, 0.05 and 0.1 levels, respectively. INST is institutional ownership. ABSDA is absolute value of discretionary accruals. SIZE is firm size. GROWTH is sale growth. LEV is leverage.

Table 10. Number (Percentage) of Firms in Each Regime by Year

Regime	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Average
INST $\leq 43.8\%$	197 (71%)	193 (70%)	186 (67%)	182 (66%)	176 (64%)	173 (63%)	170 (62%)	175 (63%)	164 (59%)	154 (56%)	146 (52%)	174 (63%)
43.8% $<$ INST $\leq 48.8\%$	24 (9%)	19 (7%)	25 (9%)	26 (9%)	20 (7%)	17 (6%)	23 (8%)	18 (7%)	24 (9%)	23 (8%)	21 (8%)	22 (8%)
INST $> 48.8\%$	56 (20%)	65 (23%)	66 (24%)	69 (25%)	81 (29%)	87 (31%)	84 (30%)	84 (30%)	89 (32%)	100 (36%)	110 (40%)	81 (29%)

()denotes annual sample of percentage